# Clinical nutrition and foodservice personnel in teaching hospitals have different perceptions of total quality management performance

*YUKYEONG CHONG, PhD; NAN UNKLESBAY, PhD, RD; RICHARD DOWDY, PhD*

## ABSTRACT

**Objective** To investigate the perceived total quality management (TQM) performance of their department by clinical nutrition managers and dietitians, and foodservice managers and supervisors, in hospital food and nutrition service departments.
**Design** Using a 2-part questionnaire containing items about 3 constructs of TQM performance and demographic characteristics, participants rated their perceptions of TQM performance.
**Subjects** Employees in 7 Council of Teaching Hospitals. Of the 128 possible respondents, 73 (57%) completed the study.
**Statistical analyses performed** Correlation analysis to identify relationships between demographic characteristics and TQM performance. Analysis of variance to investigate statistical differences among hospitals and between subject groups and types of employment positions.
**Results** Three TQM constructs—organization, information, and quality management—were evaluated. The clinical nutrition manager and dietitian group had mean ratings between 3.1 and 4.7 (5-point Likert scale); the foodservice manager and supervisor group had mean ratings from 2.7 to 4.0. Education level was significantly correlated ($r$=0.44) to performance of employee training in the clinical nutrition group. The number of employees directly supervised was negatively correlated ($r$=–0.21) to the performance of employee training in the foodservice group.
**Applications** As the dynamic roles of dietitians change, many dietitians will occupy management positions in organizations such as restaurants, health food stores, food processing/distribution companies, and schools. This study demonstrates how a TQM survey instrument could be applied to clinical nutrition and foodservice settings. Dietitians will need to assess TQM in their workplace facilities, especially because of the direct links of TQM to productivity and client satisfaction. *J Am Diet Assoc. 2000;100:1044-1049.*

The primary total quality management (TQM) principles are to focus on satisfying the needs and expectations of customers and to constantly improve the quality of all organizational activities and processes (1-4). The 3 components of a TQM strategy are customers, processes, and employees (5). Juran (6) identified determining customer needs and developing product features that respond to them as essential elements in the quality planning process. In TQM a process is defined as "a series of operations linked together to provide a result that has increased value" (7). Results should meet customers' needs while achieving reduced process variation and completion time.

Communication is an important function in different hierarchical structures (8). Hess (9) and Beasley (10) applied the method of Deming (11) in their studies of hospital food and nutrition services. Health care professionals recognize that TQM is not mastered quickly and that the process needs consistent attention (12). A system involving rapid and continual assessment has been suggested by researchers in health care facilities (13).

Quality assurance has been used to measure quality of care (14-16) and to evaluate the accuracy of hospital tray lines (17). Quality assurance is employed in most hospitals to meet regulatory requirements, is used as a tool for evaluating the quality of care, and focuses on the individual provider, often motivating people by fear (18). In contrast, continuous quality improvement is a more effective system for converting specific patient needs into effective clinical outcomes with the goal of "achieving excellence as defined by patient satisfaction, clinical and functional status outcomes, cost, and external regulatory requirements" (19). Continuous quality improvement focuses on the system's performance first and the individual's performance second.

*Y. Chong is conducting postdoctoral research at the University of Nevada, Las Vegas, Nev; at the time of this study, she was a doctoral candidate at the University of Missouri—Columbia. N. Unklesbay is with the Food Science Department and R. Dowdy is with the Nutritional Sciences Department, University of Missouri-Columbia.*

*Address correspondence to: Nan Unklesbay, PhD, RD, Food Science Department, 256 William C. Stringer Wing, University of Missouri—Columbia, Columbia, MO 65211.*

Recognition of the importance of TQM implementation and commitment to quality improvement in food and nutrition services in hospitals has increased. However, limited research has been published that evaluate the performance of TQM approaches in hospital food and nutrition services. Performance measures in the accreditation process of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) evaluate an entire hospital and provide broad standards and examples of performance for dietitians (19). The JCAHO requirements should be applied to food and nutrition services and actively promoted (20,21).

This study was designed to investigate and compare the perceived TQM performance of their department by clinical nutrition managers and dietitians and by foodservice managers and supervisors in teaching hospitals.

## METHODS

To solicit participation, letters were mailed to managers of food and nutrition services in the 11 Missouri hospitals that were members of the Council of Teaching Hospitals (22). Seven agreed to participate and their organizational charts were obtained. Four hospitals did not participate; in one hospital the position of food and nutrition services director was vacant and in 3 hospitals the employee unions rejected participation.

### Subjects

Subjects consisted of a foodservice group and a clinical nutrition group. A foodservice director or manager and foodservice supervisors were included in the foodservice group for which there were 67 possible respondents. Clinical nutrition managers and clinical nutrition dietitians were included in the clinical nutrition group for which there were 61 possible respondents.

### Instrument

A 2-part questionnaire developed and validated by Chong (23) was used. The first part, which rated perceived TQM performance, contained 41 and 46 statements for the clinical nutrition and foodservice groups, respectively. The statements sought perceptions of participants regarding TQM performance of their departments for 3 management constructs: organization, information, and quality management. The organization management construct consisted of 6 aspects: quality policy, strategies, responsibility, employee involvement, employee training, and reward system. The information management construct had 3 aspects: conducting documentation, providing information in a communication system, and exchanging information. The quality management construct also had 3 aspects: quality evaluation, objective quality results, and standard procedures.

All statements regarding organization management and information management contained basically the same content for the clinical nutrition and foodservice groups. Quality management statements were different: they focused on quality of nutrition care and standards of care for the clinical nutrition group and quality of food products and service for the foodservice group. Respondents were asked to indicate their perceived performance using a 5-point Likert scale; 1 indicated a strongly negative reaction to the statement and 5 indicated a strongly positive reaction.

Cronbach $\alpha$ was calculated to evaluate the internal consistency of the survey instrument. For perceived TQM performance, interitem correlations and Cronbach $\alpha$ values were obtained for each management construct. Cronbach $\alpha$ for organization management was 0.85, and it was 0.82 for information management. The $\alpha$ for quality management for the foodservice group was 0.96, and for the clinical nutrition group it was 0.85. These coefficients indicated acceptable reliability of the survey instrument (24).

The second part of the survey instrument elicited demographic data: gender, age, employment status, education level, hospital work experience, position in organization, and number of employees directly supervised.

### Statistical Analyses

Data analysis was conducted with the Statistical Analysis System (PC SAS for Windows, version 6.12, SAS Institute, Cary, NC). Descriptive statistics were used to analyze data for gender, age, and education level. The Pearson product moment correlation coefficients was conducted to identify relationships among education level, work experience in food and nutrition services, and number of employees directly supervised and perceived TQM performances.

Analysis of variance was performed to investigate differences among the 7 hospitals, between the clinical nutrition and foodservice groups, and between 2 types of positions in the department organization (clinical nutrition manager/foodservice manager and clinical nutrition dietitian/foodservice supervisor).

## RESULTS

### Characteristics of Hospitals

All hospitals were accredited by JCAHO; operating bed capacities ranged from 145 to 360. Foodservice and clinical nutrition were in the same department in 3 hospitals, 2 hospitals were separating them at the time of our study, and 2 operated separate departments. In 2 hospitals commercial companies served all meals.

### Profile of Respondents

The overall survey response rate was 60%, with 77 of 128 possible respondents: 42 in the clinical nutrition group and 35 in the foodservice group. This rate compared favorably with data from previous research studies (25,26). Demographic data for the 77 participants are given in Table 1. Most of the clinical nutrition managers and dietitians did not directly supervise employees. The characteristics of the subjects in this study were different from those in a previous study (27) in which 55% of the respondents supervised employees.

### Overall TQM Performance Perceived by Respondents

The 21 variables measured for organization, information, and quality management are listed in Table 2. Each variable had several attributes. For example, for nutrition care process evaluation (III-1-f in Table 2), respondents rated their regular evaluations of the nutrition assessment process, the nutrition education process, their patients' understanding of nutrition education, and the nutrition care process (21). Profile means of the clinical nutrition group perceived TQM performance variables ranged from 3.1 to 4.7 (5-point Likert scale) (Table 2). These means were higher than those of the foodservice group (range=2.7 to 4.0). The highest means for perceived TQM performance variables in the clinical nutrition group were conducting documentation regarding care, quality policies and quality goals, and communication process evaluation; the 3 highest variables in the foodservice group were patient satis-

**Table 1**
Demographic data of study subjects (N=77)

| Variable | Clinical nutrition group (n=42)[a] | | Foodservice group (n=35)[a] | |
|---|---|---|---|---|
| | No. | % | No. | % |
| **Gender** | | | | |
| Female | 41 | 97 | 22 | 64 |
| Male | 1 | 3 | 13 | 36 |
| **Age (y)** | | | | |
| <20 | 0 | 0 | 1 | 3 |
| 20-29 | 10 | 24 | 2 | 6 |
| 30-39 | 16 | 37 | 11 | 31 |
| 40-49 | 13 | 32 | 15 | 43 |
| 50-59 | 2 | 5 | 6 | 17 |
| ≥60 | 1 | 2 | 0 | 0 |
| **Education level** | | | | |
| High school or less | 0 | 0 | 6 | 17 |
| Some college | 0 | 0 | 14 | 40 |
| College graduate | 16 | 38 | 7 | 20 |
| Graduate work | 7 | 17 | 2 | 6 |
| Graduate degree | 19 | 45 | 6 | 17 |
| **Hospital work experience (y)** | | | | |
| ≤2 | 18 | 43 | 7 | 20 |
| 3-5 | 8 | 19 | 2 | 6 |
| 6-10 | 8 | 19 | 7 | 20 |
| ≥11 | 8 | 19 | 19 | 54 |
| **No. of employees supervised** | | | | |
| 0 | 35 | 84 | 0 | 0 |
| 1-3 | 1 | 2 | 1 | 3 |
| 4-8 | 2 | 5 | 6 | 17 |
| 9-15 | 3 | 7 | 12 | 34 |
| >15 | 1 | 2 | 16 | 46 |
| **Position in organization** | | | | |
| Manager | 6 | 14 | 11 | 31 |
| Dietitian | 36 | 86 | NA[b] | NA |
| Supervisor | NA | NA | 24 | 69 |

[a]Clinical nutrition group=clinical nutrition managers and dietitians; Foodservice group=foodservice managers and foodservice supervisors.
[b]NA=not applicable.

faction evaluation, quality policies and quality goals, and standard procedures. The TQM performance variables with the lowest means for the clinical nutrition group were employee satisfaction evaluation, reward system based on employees' efforts, and employee training. Providing information through communication system, employee satisfaction evaluation, and reward system were the lowest 3 variables for the foodservice group (Table 2). Patient satisfaction evaluation (III-1-6) received scores of 3.6 and 4.2 from the clinical nutrition and foodservice groups, respectively.

### Correlation Analysis Between Perceived TQM Performance and Demographic Variables of Respondents

Table 2 lists the values for correlation analyses between education level, work experience in hospital food and nutrition services, and number of employees directly supervised and perceived TQM performances. For the clinical nutrition group, education level was positively correlated to the variables of overall organization management (I), employee training (I-5), responsibility (I-3), and standard procedures (III-3). Work experience was positively correlated to quality evaluation (III-1), quality improvement concept (III-1-d), and nutrition care quality evaluation (III-1-g). No correlations were found between the number of supervised employees and the variables. For the foodservice group, the number of employees directly supervised was negatively correlated to employee training (I-5). For patient satisfaction evaluation, the foodservice group rated this variable higher than the clinical nutrition group.

### Comparisons of Perceived TQM Performance Between Types of Position, Subject Groups, and Hospitals

Positions were classified to indicate manager (CN managers and FS managers, n=17) and employee (clinical nutrition dietitian and foodservice supervisor, n=60). Analysis of variance for organization management (1) showed that there was a statistically significant difference between type of position for quality policy (I-1) and employee involvement in planning quality care (I-4); namely, managers perceived higher TQM performances than employees. For overall information management (II), conducting documentation (II-1), and providing information through communication system (II-2), there were significant differences between the 2 types of position: scores were 4.1 vs 3.7, 4.6 vs 4.2, and 3.9 vs 3.3, for managers and employees, respectively. For perceived performance of providing information through the communication system (II-2), an interaction occurred between type of position and subject group. Clinical nutrition managers, foodservice managers, and clinical nutrition dietitians rated performance on information management variables more highly than foodservice supervisors.

Significant differences were detected among the 7 hospitals for 6 variables of TQM performance: overall information management (II), exchanging information (II-3), overall quality management (III), patient satisfaction evaluation (III-1-b), communication process evaluation (III-1-c), and standard procedures (III-3). One hospital had low scores for these 6 variables, ranging from 2.53 for standard procedures to 3.0 for overall quality management. These scores were 1.5 to 2.0 points below those of the other hospitals. No consistent differences were noted between the food and nutrition services systems and among 3 types of department structures. One hospital rated performance in exchanging information (II-2) significantly high, and one hospital rated performance high in

**Table 2**
Profiles of total quality management (TQM) performance and correlations with education, work experience, and number of employees supervised

| Variable | CN (n=42)[a] | | | | FS (n=35)[a] | | | |
|---|---|---|---|---|---|---|---|---|
| | Profile mean±SD[b] | Education level | Work experience | No. of employees supervised | Profile mean±SD | Education level | Work experience | No. of employees supervised |
| | | ← r value → | | | | ← r value → | | |
| **I. Overall organization management** | 3.8±0.4 | 0.34* | 0.27 | −0.04 | 3.4±0.7 | 0.03 | 0.20 | −0.15 |
| 1 Quality policies and quality goals | 4.4±0.5 | −0.27 | 0.08 | 0.01 | 4.0±0.7 | 0.41 | −0.03 | −0.04 |
| 2 Strategies to provide product quality | 3.6±0.6 | 0.01 | −0.02 | −0.24 | 3.7±0.6 | 0.03 | −0.01 | 0.22 |
| 3 Responsibility displayed on organizational chart | 4.1±0.7 | 0.30 | 0.23 | 0.09 | 3.8±1.0 | 0.12 | 0.13 | 0.05 |
| 4 Employee involvement in planning quality care | 4.1±0.8 | 0.21 | 0.11 | −0.09 | 3.0±1.0 | 0.03 | 0.18 | −0.21 |
| 5 Employee training program containing quality concepts | 3.3±0.8 | 0.44** | 0.31 | 0.08 | 3.2±1.0 | −0.21 | 0.30 | −0.38* |
| 6 Reward system based on employees' efforts | 3.1±0.8 | 0.35 | 0.24 | −0.15 | 3.0±1.0 | 0.15 | 0.19 | −0.09 |
| **II. Overall information management** | 4.1±0.4 | −0.02 | 0.08 | 0.11 | 3.6±0.9 | 0.14 | 0.04 | −0.15 |
| 1 Conducting documentation regarding care | 4.7±4.5 | 0.03 | 0.25 | −0.01 | 4.9±1.0 | 0.27 | −0.09 | −0.28 |
| 2 Providing information through communication system | 3.9±0.7 | −0.06 | −0.04 | 0.09 | 2.7±1.2 | 0.18 | 0.19 | −0.04 |
| 3 Exchanging information with other departments | 3.8±0.5 | 0.03 | 0.03 | 0.13 | 3.6±0.8 | −0.14 | −0.30 | −0.10 |
| **III. Overall quality management** | 3.7±0.4 | −0.17 | 0.31 | −0.12 | 3.7±0.6 | −0.11 | −0.03 | −0.18 |
| 1 Quality evaluation | 3.8±0.4 | −0.08 | 0.34* | −0.05 | 3.7±0.7 | −0.08 | −0.08 | −0.17 |
| 1-a Employee satisfaction evaluation | 3.1±0.8 | 0.16 | 0.12 | 0.06 | 2.9±1.3 | −0.01 | 0.11 | −0.23 |
| 1-b Patient satisfaction evaluation | 3.6±0.9 | −0.18 | 0.21 | −0.01 | 4.2±0.7 | 0.14 | −0.10 | −0.22 |
| 1-c Communication process evaluation | 4.1±0.6 | 0.01 | 0.28 | −0.08 | 3.8±0.9 | −0.10 | −0.07 | −0.25 |
| 1-d Quality improvement concept | 3.8±0.7 | 0.22 | 0.37* | 0.12 | 3.6±0.8 | −0.12 | −0.14 | −0.17 |
| 1-e Documentation analysis evaluation | 4.1±0.6 | −0.21 | 0.15 | −0.18 | 3.8±0.9 | −0.14 | −0.22 | 0.07 |
| 1-f Nutrition care process evaluation | 3.8±0.7 | −0.27 | −0.07 | −0.10 | | | | |
| 1-g Nutrition care quality evaluation | 4.0±0.4 | 0.03 | 0.40* | 0.02 | | | | |
| 1-h Food process evaluation | | | | | 3.8±0.7 | −0.04 | −0.18 | −0.02 |
| 1-i Food quality evaluation | | | | | 3.8±0.7 | −0.15 | 0.04 | −0.08 |
| 2 Objective quality results | 3.4±0.5 | 0.05 | −0.06 | −0.06 | 3.5±0.6 | −0.11 | 0.01 | −0.09 |
| 3 Standard procedures | 4.0±0.6 | −0.32 | −0.15 | −0.15 | 4.0±0.6 | −0.12 | −0.01 | −0.24 |

[a]CN group=clinical nutrition managers and dietitians; FS group=foodservice managers and foodservice supervisors.
[b]Mean score on a 5-point Likert scale. SD=standard deviation.
*$P<.05$. **$P<.01$.

standard procedures (III-3). Other than these findings, the TQM performances for quality management for the hospitals were rated relatively similar to one another.

A trend toward segmentation is occurring in hospital food and nutrition services, whereby foodservices and clinical nutrition services are separate

## DISCUSSION

Because the hospitals were accredited by JCAHO, quality policies should have been firmly fixed. In accordance with the quality policies, quality goals or standards of care should have been stable and perceived as relatively high by respondents. Performance in regard to quality policy was one of the items rated highest by both the clinical nutrition and foodservice groups. The clinical nutrition group had a significantly higher score for quality policies and quality goals for foodservice and nutrition care than the foodservice group. When systems and types of health care organizations differ, strategies and goals may be different. Development of organization quality policy should be an individual process and unique to each organization (29). Although it is beyond the scope of this study to document specific quality policies and goals, our data indicated that the hospitals had their own distinct quality missions.

The clinical nutrition group highly rated conducting documentation, probably because almost all clinical nutrition dietitians kept files (manual or computerized) about patients' nutrition status after counseling. The clinical nutrition group perceived patient satisfaction evaluation relatively lower than the foodservice group. The foodservice group perceived high performance in conducting patient satisfaction evaluation in terms of food quality and foodservice, whereas the clinical nutrition group perceived low performance on this variable in terms of nutrition care. Nutrition care is one of the essential roles of the clinical nutrition professional. As organizational structures of food and nutrition services are reorganized and clinical nutrition becomes one of the clinical professional services, patient feedback data about nutrition care should be collected and reflected on so that improvements can be made. As Cartin (3) stated, for effective TQM implementation, satisfaction of internal customers (ie, people inside the organization) should be considered along with external customers (ie, people outside of the organization, such as patients or patients' families). Customer values should be at the heart of organizational strategy to improve the quality maturity of the organization (26).

For the performance of quality evaluation regarding employee satisfaction (III-1-a), the survey item "our department identifies the causes of employee dissatisfaction" was rated as one of the lowest variables (Table 2). In research studies assessing level of job satisfaction among dietitians, satisfaction was highest for supervision received and lowest for pay and promotion (29-32). Additionally, Dalton et al (31) found that the main reasons for the apparent shortage of dietitians were low salaries, lack of recognition, limited career growth, and lack of challenging job functions. Conducting satisfaction assessments of internal customers (employees) to determine their satisfaction and to identify causes of dissatisfaction has been reported to improve satisfaction of external customers (5,6).

The reward system is another motivator of employee satisfaction. This factor of extrinsic motivation is an important element in interactions among managers and all management systems. Inappropriate rewards are a source of discouragement (11,33,34). The perceived performance of the reward system was rated low by the clinical nutrition and foodservice groups, who were asked if employees are rewarded for their performance and if the reward system is based on employees' quality improvement efforts. Hospital food and nutrition services should identify the causes of employee dissatisfaction, including the reward system, so that they can increase employee satisfaction and subsequently improve productivity of the organization.

The negative correlation in the foodservice group between the number of employees directly supervised and perceived performance for employee training indicates that when foodservice managers train employees, they should have a smaller number of trainees. This change could increase the effectiveness of employee training programs that include quality concepts. Knight and Kotschevar (34) reported that TQM programs, such as quality circles, implemented in the foodservice industry have not generally succeeded, except for those involving employee training.

Total employee involvement is the art of getting everyone in the organization to assume responsibility for making his or her job easier, more efficient, more productive, and safer (35). In our study, perceived performance for employee involvement (ie, employee participation in planning quality care) was different between the clinical nutrition and foodservice groups. By involving employees in problem solving and decision making, employee performance and productivity can be increased. Employee involvement is an essential element in creating a team. Employee group-based activities contribute to achieving efficiency and quality improvement in the organization through team improvement (36). In addition, employees tend to become more loyal and satisfied when their ideas are reflected in practice. Hence, they are more motivated to continue the improvement process (3). Employee involvement in a process is also an important management tool to improve productivity and quality.

Information management focuses on discussing mission and purpose, reviewing and clarifying objectives of the organization, developing an understanding of policies and procedures, reviewing specific goals for quality, and becoming up-to-date about emerging quality developments (37). To exchange information effectively, valuable data and information should be documented through an appropriate communication system in

the organization. If quality exists, it must be documented appropriately, and producers must develop, implement, and maintain written procedures for continuous improvement (35). In this study, conducting documentation and providing information through the communication system were rated differently by groups and positions. The clinical nutrition and foodservice managers perceived higher TQM performance in information management than the clinical nutrition dietitians and foodservice supervisors, and dietitians rated the communication system more highly than foodservice supervisors. Foodservice supervisors are in close contact with foodservice employees; therefore, their perceived performance of information management is likely to influence the performance of the employees they supervise.

Achievement of quality management, the third TQM construct, can be viewed as the ultimate goal of organization and information management.

## APPLICATIONS/CONCLUSIONS

- Various roles of dietitians in organizations other than health care are emerging, changing, and being enhanced. Dietitians who recognize the value of assessing TQM impact can apply TQM concepts in these organizations, whether they are restaurants, catering companies, schools, health food stores, or food processing/distribution companies. Frequent surveys, such as the TQM instrument described herein, will greatly assist dietitians in these new roles.
- None of the construct variables recommended for an effective TQM policy received a perfect score (5.0) from either the clinical nutrition or foodservice group. Dietetics educators should concentrate on the lower scores, (eg, patient satisfaction evaluation and reward system) and provide information in undergraduate and graduate programs about these subjects. If graduates of such programs are employed effectively, we should expect them to have significant positive correlations for most of the TQM variables. Similarly, in human resource management programs, a score of 2.9 for employee satisfaction evaluation needs serious investigation.
- A trend toward segmentation is occurring in hospital food and nutrition services, whereby foodservices and clinical nutrition services are separate. Further studies on the organization construct of TQM are recommended to consider department structures from different perspectives.

### References


**1.** McLaughlin CP, Kaluzny AD. *Continuous Quality Improvement in Health Care: Theory, Implementation, and Application.* Gaithersburg, Md: Aspen;1994.
**2.** Shortell SM, Levin DZ, O'Brien JL, Hughes EFX. Assessing the evidence on CQI: is the glass half empty or half full? *Hosp Health Serv Admin.* 1995;40 (special CQI issue):4-24.
**3.** Cartin TJ. *Principles and Practices of TQM.* Milwaukee, Wis: ASQC Quality Press; 1993.
**4.** Press I. The quality movement in U.S. health care: implications for anthropology. *Hum Organ.* 1997;56:1-8.
**5.** Pike J, Barns R. *TQM in Action: A Practical Approach to Continuous Performance Improvement.* New York, NY: Chapman & Hall; 1994.
**6.** Juran JM. The quality trilogy. *Quality Progress.* 1986; August:19-24.
**7.** Jablonski JR. *Implementing TQM: Competing in the Nineties through Total Quality Management.* 2nd ed. San Diego, Calif: Pfeiffer & Co; 1992.
**8.** Rao A, Carr LP, Dambolena I, Kopp RJ, Martin J, Rafii F, Schlesinger PF. *Total Quality Management: A Cross-Functional Perspective.* New York, NY: John Wiley & Sons; 1996.
**9.** Hess MB. President's page: minding your TQMs. *J Am Diet Assoc.* 1991;91:1126-1128.
**10.** Beasley MA. The story behind quality improvement. *Food Manage.* 1991;26:52.
**11.** Deming WE. *Out of the Crisis.* Cambridge, Mass: Massachusetts Institute of Technology; 1986.
**12.** Early G, Robert SR, Golden WE, Chassin MR, Donaldson M. Defining and improving health care quality [letter]. *JAMA.* 1999;281:984-985.
**13.** Yasin MM, Czuchry AJ, Jennings DL, York C. Managing the quality effort in a health care setting: an application. *Health Care Manage Rev.* 1999;24:45-52.
**14.** Puckett RP. JCAHO's agenda for change. *J Am Diet Assoc.* 1991;91:1225-1226.
**15.** Ometer LT, Oberfell MS. Quality assurance, I: a level of care model. *J Am Diet Assoc.* 1982;81:129-132.
**16.** Oberfell MS, Ometer LT. Quality assurance, II: application of oncology standards against a level of care model. *J Am Diet Assoc.* 1982;81:132-134.
**17.** Hay AL, Stake SG. Tray assembly training improves accuracy in hospital foodservice. *J Foodservice Syst.* 1988;5:29-41.
**18.** Paul L. Quality assessment tools and value. *Physician Executive.* 1996;October: 1.
**19.** The Joint Commission on Accreditation of Healthcare Organizations. Comprehensive accreditation manual for hospitals. Oakbrook Terrace, Ill: JCAHO; 1996.
**20.** Edelstein SF. Using thresholds to monitor dietetic services: the JCAHO 10-step process for quality assurance. *J Am Diet Assoc.* 1991;91:1261-1265.
**21.** Robinson GE. Applying the 1996 JCAHO nutrition care standards in a long-term-care setting. *J Am Diet Assoc.* 1996;96:400-406.
**22.** Fischer CA, Schwartz CA. *National Organizations of the US.* 30th ed. Gale Research; 1996. *Encyclopedia of Associations*; Vol 1.
**23.** Chong YK. *Evaluation of TQM Performance and Organizational Management Effectiveness for Foodservice and Clinical Nutrition Service Management in Hospital Settings* [dissertation]. Columbia, Mo: University of Missouri; 1998.
**24.** Nunnally J. *Psychometric Theory.* 2nd ed. New York, NY: McGraw-Hill; 1978.
**25.** Digh EW, Dowdy RD. A survey of management tasks completed by clinical dietitians in the practice setting. *J Am Diet Assoc.* 1994;94:1381-1384.
**26.** Wolf KN, Schiller MR. Dietetics and foodservice personnel are ready for team problem solving. *J Am Diet Assoc.* 1997;97:997-1002.
**27.** Arensberg MBF, Schiller MR, Vivian VM, Johnson WA. Transformational leadership of clinical nutrition managers. *J Am Diet Assoc.* 1996;96:39-45.
**28.** Kaye M, Dyason M. Customer value-driven strategies. *Total Quality Manage.* 1999;4/5:S594-S601.
**29.** Agriesti-Johnson C, Broski D. Job satisfaction of dietitians in the United States. *J Am Diet Assoc.* 1982;81:555-562.
**30.** Rehn BL, Stallings SF, Wolman PG, Cullen RW. Job satisfaction of South Carolina dietitians. *J Am Diet Assoc.* 1989;89:979-981.
**31.** Dalton S, Gilbride JA, Russo L, Vergis L. Job satisfaction of clinical, community, and long-term-care dietitians in New York City. *J Am Diet Assoc.* 1993;93:184-186.
**32.** Gilbride JA, Dalton S. Job satisfaction survey of dietitians in New York State [abstract]. *J Am Diet Assoc.* 1990;90(suppl):A-108.
**33.** Latzko WJ, Saunders DM. *Four Days with Dr Deming: A Strategy for Modern Methods of Management.* New York, NY: Addison-Wesley Publishing Co; 1995.
**34.** Knight JB, Kotschevar LH. *Quantity Food Production, Planning, and Management.* 2nd ed. Melbourne, Victoria, Australia: Van Nostrand Reinhold; 1997.
**35.** Stamatis DH. *TQM Engineering Handbook.* New York, NY: Marcel Dekker; 1997.
**36.** Barnard J. The empowerment of problem-solving teams: is it an effective management tool? *J Appl Manage Stud.* 1999;8:73-82.
**37.** Mahoney FX, Thor CG. *The TQM Trilogy: Using ISO 9000, the Deming Prize, and the Baldrige Award to Establish a System for Total Quality Management.* New York, NY: American Management Association; 1994.


*This research was funded in part by Missouri Agricultural Experiment Station Journal Series No. 12, 905.*